

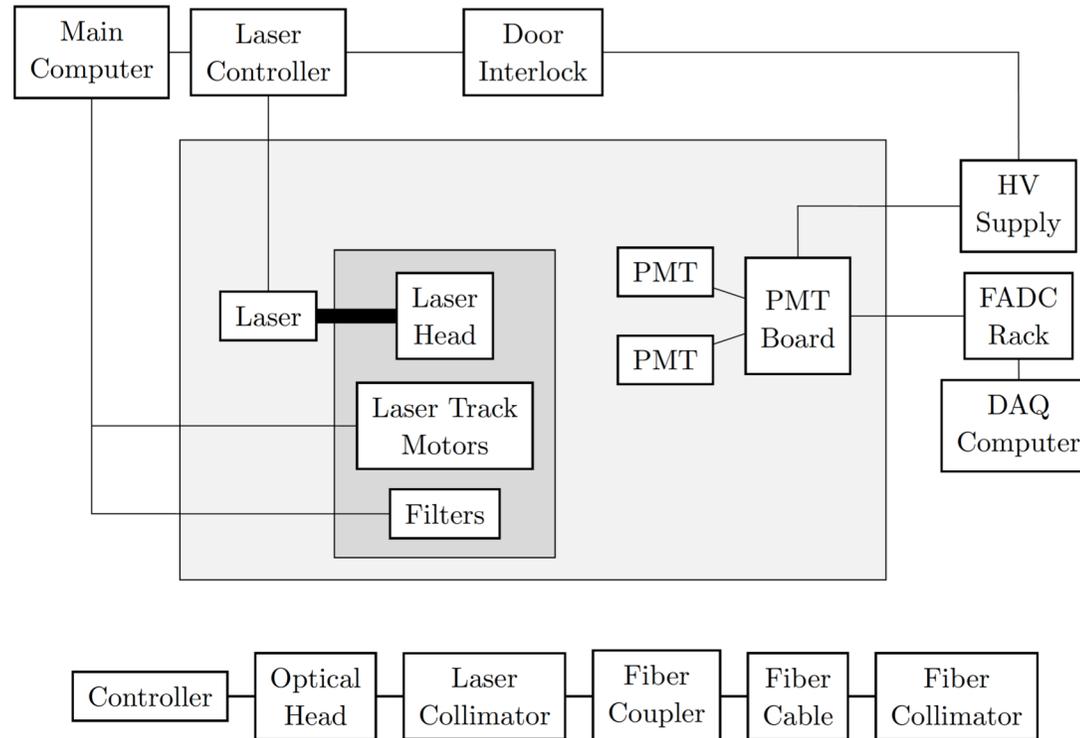
RICH laser test stand Safety Training

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The RICH laser test stand

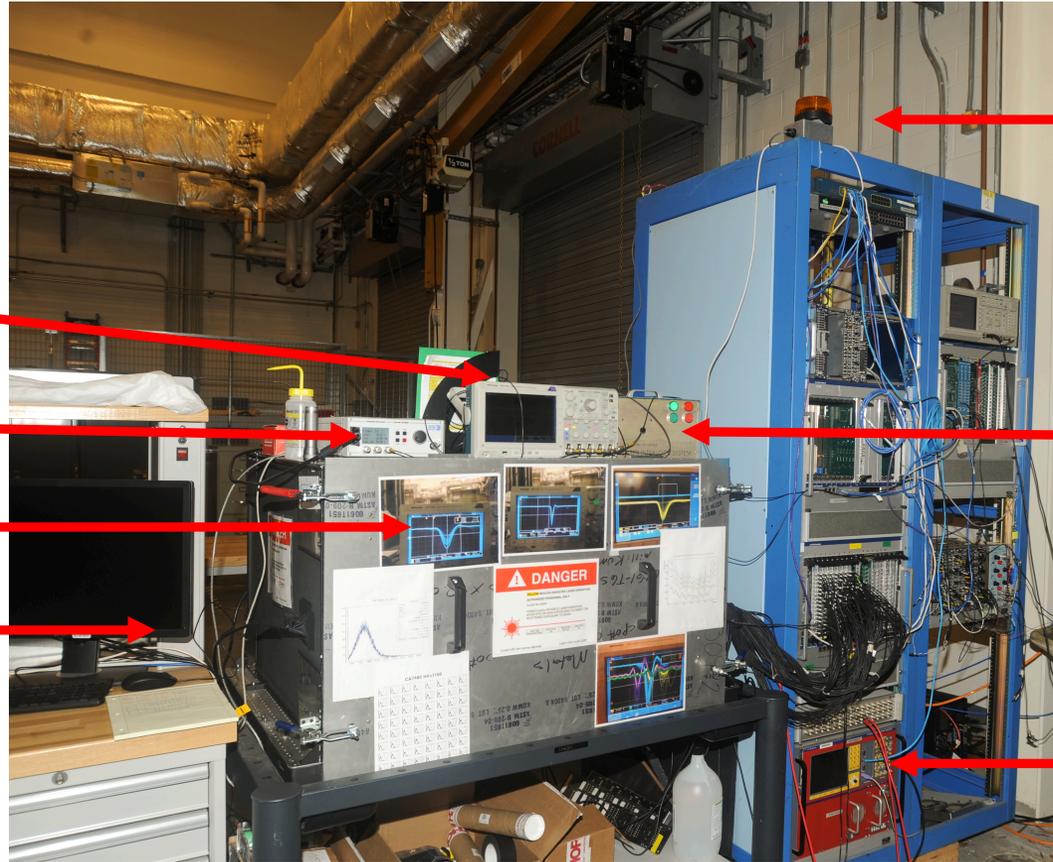
- Located in Highbay area
- Optical table
- Black box
 - 470 nm Laser head with fiber optics coupling and collimator
 - Computer controlled wheel with optical filters
 - Computer controlled motors
 - Circuit board 6 HAMAMATSU MAPMTs
- Computer controlled digital control unit for PiLas lasers with repetition rate up to 1 MHz
- Laser interlock safety box
- Yellow beacon
- DAQ computer
- HV and LV power supply

Schematic diagram of the RICH laser stand



RICH PMT laser test stand

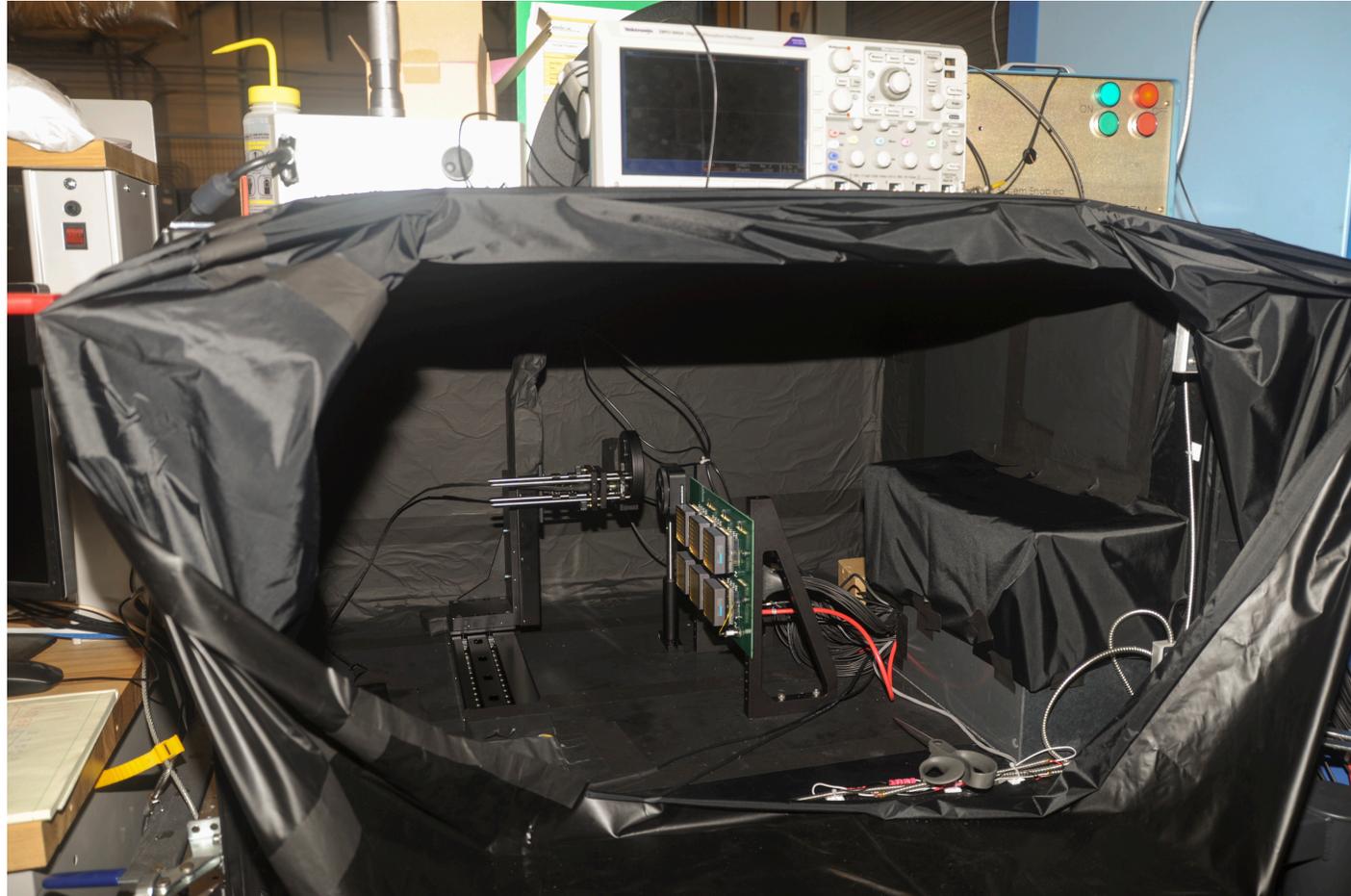
- Scope
- Laser Controller
- Black Box
- Desktop



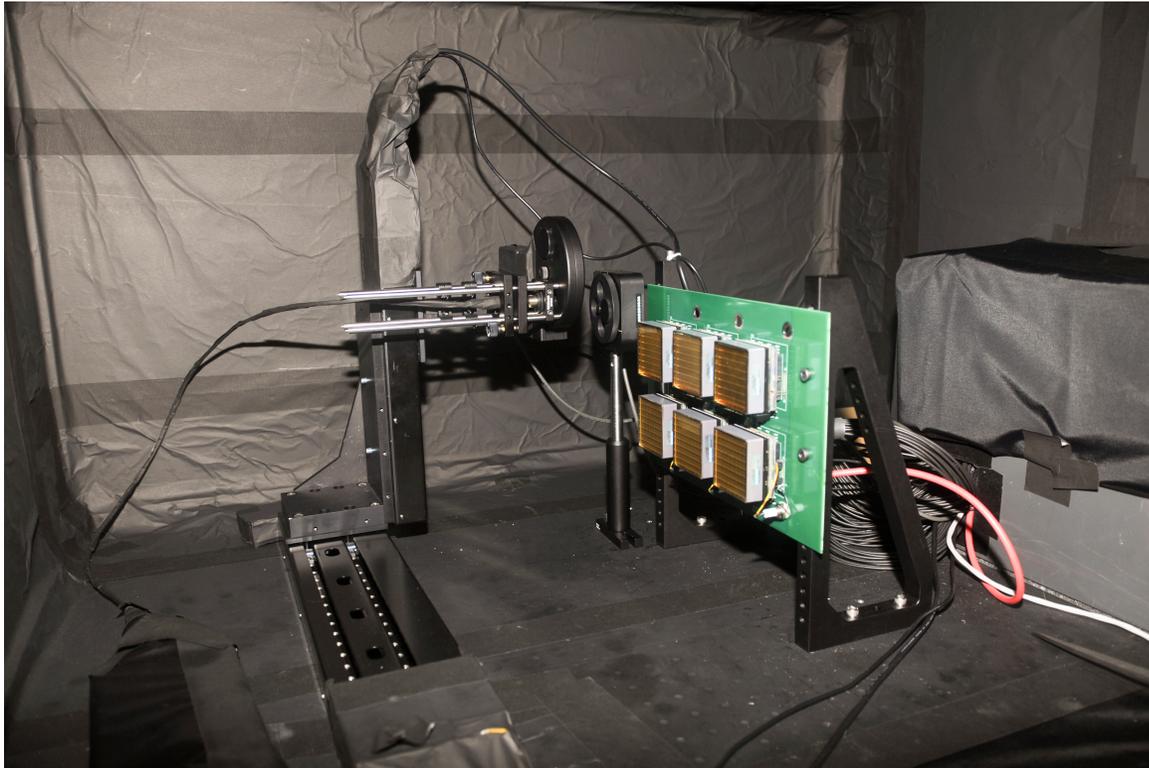
- Laser beacon
- Safety Box
- HV and LV

Inside Black Box

Non-reflective Black Material



Inside Black Box



- Laser Head
- Wheel with 6 Filters
- Laser Beam profiler
- Motors
- Circuit Board for 6 PMTs
- Laser, wheel, motors are computer controlled

Laser Interlock Safety Box



Laser Controller



Laser Types/Rating

- Lasers are rated by a classification system based on the laser's hazard. This hazard is based on:
 - the wavelength of the emitted radiation;
 - the source of the laser radiation exposure;
 - duration of exposure;
 - the laser power;
 - the potential for hazard.
- Class-1 : very low-power lasers that cannot emit radiation at known hazard levels under normal operating conditions.
- Class-2 : low-power visible light lasers, which have insufficient power to cause eye damage within the average operating conditions. Direct viewing of the beam without blinking can cause injury.
- Class-3a : medium-power lasers. Direct viewing of beam can cause injury.
- **Class-3b: medium-power lasers that present a direct and indirect viewing hazard that can cause eye injury.**
- Class-4 : high-power lasers that present a direct and indirect viewing hazard; eye and skin injury are possible; presents a fire hazard.

Hazard Avoidance

- Lasers are classified according to their degree of hazard, from minimal class-1 to extreme class-4.
- The biggest hazard with the Hall B class-3b lasers is damage to the eye due to direct or indirect viewing of the beam. The Hall B laser system is rated as class-1 when all interlocks and shields are in place.
- The system cannot be operated if the door of the black box is open. The interlock system will prevent to switch on laser as well as HV and LV power supply if the door is open.

Laser Signage

- Signage is placed on the black box
- The yellow beacon indicates that the laser is ON
- Operator can switch OFF the laser using laser interlock safety box



Requirements for Laser Use

The laser may only be operated by personnel who have completed the following requirements

- Completed the laser safety course SAF1140;
- Read the laser safety chapter of the EH&S manual (6410);
- Completed the Hall B laser safety course SAF158;
- Read the Hall B laser LSOP;
- Completed the proper medical certification through JLab Medical Services;
- Signed the list of authorized users/operators of the LSOP;
- Toured the laser stand with the LSS

Summary

- The RICH PMT test laser stand is required for calibration of the HAMAMATSU MAPMTs.
- The hazards associated with the operation of this class-3b laser system are minimal when following the guidelines laid out in this course.
- Familiarize yourself with all aspects of laser safety and communicate with the Hall B LSS if you have any questions or concerns.
- You are responsible for your own protection and the safety of others.
- Follow all safety instructions and comply with all safety regulations.